

Appln No. 09/637,764
Amdt date May 3, 2010
Reply to Office action of November 3, 2009

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Please amend claim 39 and add claims 43-61 as follows:

1. (Twice Amended) A rock bit comprising:
a body;
at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone;
a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising:
steel in the range of from 20 to 50 percent by weight; and
filler in the range of from 50 to 80 percent by weight,
the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 16 to 40 mesh and between about 80 and 200 mesh, and tungsten carbide particles selected from the group consisting of spherical cemented, crushed cemented, crushed cast, crushed macrocrystalline, and carburized.
2. (Original) The rock bit of claim 1 comprising filler in the range of from 60 to 75 percent by weight.
3. (Original) The rock bit of claim 1 wherein the filler comprises in the range of from 20 to 50 percent by weight spherical cast tungsten carbide particles.

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4. (Original) The rock bit of claim 1 wherein the filler comprises in the range of from 40 to 100 percent by weight spherical cast tungsten carbide particles.
- 5-6. (Canceled)
7. (Twice Amended) The rock bit of claim 1 wherein the filler comprises spherical cast tungsten carbide particles having particle sizes between about 100 to 200 mesh.
8. (Twice Amended) The rock bit of claim 1 wherein the filler further comprises macrocrystalline tungsten carbide particles having particle sizes between about 40 to 80 mesh.
9. (Amended) A rock bit as recited in claim 1 wherein the hardfacing comprises in the range of from 10 to 90 percent by weight spherical cast tungsten carbide particles having particle sizes between about 16 to 40 mesh, and further comprises ultra-fine tungsten carbide particles in the range of from 10 to 35 percent by weight of the filler material, the particles having particle sizes in the range of from about 1 to 50 microns.
10. (Original) A rock bit as recited in claim 9 wherein the ultra-fine tungsten carbide particles are selected from the group consisting of carburized, macrocrystalline, and spherical cast.
11. (Original) A rock bit as recited in claim 9 wherein the steel in the hardfacing is dispersion strengthened by the ultra-fine tungsten carbide particles.
12. (Amended) A rock bit comprising:
a body;

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at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone;

a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising:

steel in the range of from 20 to 50 percent by weight;

filler in the range of from 50 to 80 percent by weight,

the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 80 to 200 mesh.

13. (Original) The rock bit of claim 12 comprising filler in the range of from 60 to 75 percent by weight.

14. (Original) The rock bit of claim 12 wherein the filler comprises in the range of from 20 to 50 percent by weight spherical cast tungsten carbide particles.

15. (Original) The rock bit of claim 12 wherein the filler comprises in the range of from 40 to 100 percent by weight spherical cast tungsten carbide particles.

16. (Amended) The rock bit of claim 12 wherein the filler comprises spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 100 to 200 mesh.

17. (Amended) The rock bit of claim 12 wherein the filler comprises in the range of from 10 to 99 percent by weight spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 80 to 200 mesh, and further comprises spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 16 to 40 mesh.

18. (Amended) The rock bit of claim 12 wherein the filler comprises in the range of from 10 to 99 percent by weight spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 80 to 200 mesh, and further comprises tungsten carbide particles selected from the group including spherical cemented, crushed cemented, crushed cast and crushed macrocrystalline.

19. (Amended) The rock bit of claim 18 wherein the filler further comprises macrocrystalline tungsten carbide particles having [[a]] particle [[size]] sizes between about 40 to 80 mesh.

20. (Amended) A rock bit as recited in claim 12 wherein the hard-facing comprises in the range of from 10 to 90 percent by weight spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 80 to 200 mesh, and further comprises ultra-fine tungsten carbide particles in the range of from 10 to 35 percent by weight of the filler material, the particles having a particle size in the range of from about 1 to 50 microns.

21. (Original) A rock bit as recited in claim 20 wherein the ultra-fine tungsten carbide particles are selected from the group consisting of carburized, macrocrystalline, and spherical cast.

22. (Original) A rock bit as recited in claim 20 wherein the steel in the hardfacing is dispersion strengthened by the ultra-fine tungsten carbide particles.

23. (Amended) A rock bit comprising:

a body;

at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone;

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a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising:

steel in the range of from 20 to 50 percent by weight;

filler in the range of from 50 to 80 percent by weight, the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 16 to 40 mesh and between about 80 to 200 mesh.

24. (Amended) A rock bit as recited in claim 23 wherein the hard-facing comprises in the range of from 10 to 90 percent by weight spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 16 and 40 mesh and between about 80 to 200 mesh, and further comprises ultra-fine tungsten carbide particles in the range of from 10 to 40 percent by weight of the filler material, the particles having [[a]] particle [[size]] sizes in the range of from about 1 to 50 microns.

25. (Original) A rock bit as recited in claim 24 wherein the ultra-fine tungsten carbide particles are selected from the group consisting of carburized, macrocrystalline, and spherical cast.

26. (Original) A rock bit as recited in claim 24 wherein the steel in the hardfacing is dispersion strengthened by the ultra-fine tungsten carbide particles.

27. (Amended) The rock bit of claim 23 wherein the filler comprises spherical cast tungsten carbide particles having [[a]] particle [[size]] sizes between about 100 to 200 mesh.

28. (New) A rock bit comprising:
a body;

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at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone; and

a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising,

steel, and

filler in the range of from 50 to 80 percent by weight, the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having particle sizes between about 16 mesh to less than 40 mesh.

29. (New) A rock bit as recited in claim 28 wherein the filler comprises in the range of from 19 to 100 percent by weight spherical cast tungsten carbide particles.

30. (Canceled)

31. (New) A rock bit as recited in claim 28 further comprising spherical tungsten carbide particles having particle sizes between greater than 80 to 200 mesh.

32. (New) A rock bit comprising:

a body;

at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone; and

a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising,

steel, and

filler in the range of from 50 to 80 percent by weight, the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having particle sizes between greater than 80 mesh and 200 mesh.

33. (New) A rock bit as recited in claim 32 wherein the filler comprises in the range of from 19 to 100 percent by weight spherical cast tungsten carbide particles.

34. (Canceled)

35. (New) A rock bit as recited in claim 32 further comprising spherical tungsten carbide particles having particle sizes between 16 to less than 40 mesh.

36. (New) A rock bit comprising:
a body;
at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone; and
a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising,
steel, and
filler in the range of from 50 to 80 percent by weight, the filler comprising in the range of from 10 to 100 percent by weight spherical cast tungsten carbide particles having particle sizes between about 16 to 40 mesh and between about 80 to 200 mesh.

37. (New) A rock bit as recited in claim 36 comprising steel in the range of 20 to 50 percent by weight, and wherein the spherical tungsten carbide particles have particle sizes between about 16 to less than 40 mesh and between greater than 80 to 200 mesh.

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38. (Canceled)

39. (Four Times Amended) A rock bit comprising:

a body;

at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone; and

a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising,

steel, and

filler in the range of from 50 to 80 percent by weight, the filler comprising a first weight percent of spherical cemented tungsten carbide particles and a second weight percent of spherical cast carbide particles, wherein the first weight percent is greater than the second weight percent.

40. (New) A rock bit as recited in claim 28 wherein the filler comprises in the range of from 19 to 100 percent by weight spherical cast tungsten carbide.

41. (New) A rock bit as recited in claim 32 wherein the filler comprises in the range of from 19 to 100 percent by weight spherical cast tungsten carbide.

42. (Canceled)

43. (New) A rock bit as recited in claim 39 wherein the first weight percent is 70.

44. (New) A rock bit as recited in claim 43 wherein the second weight percent is 20.

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45. (New) A rock bit as recited in claim 44 further comprising 10 weight percent carbide particles having a particle size of 30 μ m.
46. (New) A rock bit as recited in claim 39 wherein the second weight percent is 20.
47. (New) A rock bit as recited in claim 43 wherein the spherical cemented tungsten carbide particles have particle sizes in the range of 28 to 35 mesh.
48. (New) A rock bit as recited in claim 47 wherein the spherical cast carbide particles have a particle size in the range of 100 to 200 mesh.
49. (New) A rock bit as recited in claim 43 wherein the spherical cast carbide particles have a particle size in the range of 100 to 200 mesh.
50. (New) A rock bit as recited in claim 39 wherein the spherical cemented tungsten carbide particles have particle sizes in the range of 28 to 35 mesh.
51. (New) A rock bit as recited in claim 50 wherein the spherical cast carbide particles have a particle size in the range of 100 to 200 mesh.
52. (New) A rock bit as recited in claim 39 wherein the spherical cast carbide particles have a particle size in the range of 100 to 200 mesh.
53. (New) A rock bit comprising:
a body;
at least one cutting cone rotatably mounted to an end of the body, wherein the cone includes a gage surface at a heel portion of the cone; and

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a number of teeth on the cone, the teeth including a plurality of inner row teeth and a plurality of gage row teeth located near a heel of each cone, wherein the teeth include a hardfacing comprising,

steel, and

filler in the range of from 50 to 80 percent by weight, the filler comprising a first weight percent of spherical cemented tungsten carbide particles and a second weight percent spherical cast carbide particles, wherein the second weight percent is greater than the first weight percent.

54. (New) A rock bit as recited in claim 53 wherein the first weight percent is 35 and the second weight percent is 45.

55. (New) A rock bit as recited in claim 54 further comprising 20 weight percent carbide particles having a particle size of 30 μ m.

56. (New) A rock bit as recited in claim 54 wherein the spherical cemented tungsten carbide particles have particle sizes in the range of 48 to 200 mesh and the spherical cast carbide particles have a particle size in the range of 100 to 200 mesh.

57. (New) A rock bit as recited in claim 53 wherein the spherical cemented tungsten carbide particles have particle sizes in the range of 48 to 200 mesh and the spherical cast carbide particles have a particle size in the range of 100 to 200 mesh.

58. (New) A rock bit as recited in claim 53 wherein the first weight percent is 40 and the second weight percent is 50.

59. (New) A rock bit as recited in claim 58 further comprising 10 weight percent carbide particles having a particle size of 30 μ m.

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60. (New) A rock bit as recited in claim 58 wherein the spherical cemented tungsten carbide particles have particle sizes in the range of 28 to 35 mesh and the spherical cast carbide particles have a particle size in the range of 100 to 200 mesh.

61. (New) A rock bit as recited in claim 53 wherein the spherical cemented tungsten carbide particles have particle sizes in the range of 28 to 35 mesh and the spherical cast carbide particles have a particle size in the range of 100 to 200 mesh.